

Appendix 2

Sequence of recombinant dengue typ 4 virus strain rDEN4

LOCUS AF326825 10649 bp RNA VRL 03-JAN-2001
DEFINITION Dengue virus type 4 recombinant clone rDEN4, complete sequence.
ACCESSION AF326825
VERSION AF326825.1 GI:12018169
KEYWORDS .
SOURCE Dengue virus type 4.
ORGANISM Dengue virus type 4
Viruses; ssRNA positive-strand viruses, no DNA stage;
Flaviviridae;
Flavivirus; Dengue virus group.
REFERENCE 1 (bases 1 to 10649)
AUTHORS Durbin,A.P., Karron,R.A., Sun,W., Vaughn,D.W., Reynolds,M.J.,
Perreault,J.R., Men,R.H., Lai,C.J., Elkins,W.R., Chanock,R.M.,
Murphy,B.R. and Whitehead,S.S.
TITLE A live attenuated dengue virus type 4 vaccine candidate with a
30 nucleotide deletion in the 3' untranslated region is highly
attenuated and immunogenic in humans
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 10649)
AUTHORS Whitehead,S.S.
TITLE Direct Submission
JOURNAL Submitted (08-DEC-2000) LID, NIAID, 7 Center Drive, Bethesda,
MD 20892, USA
FEATURES Location/Qualifiers
source 1..10649
/organism="Dengue virus type 4"
/db_xref="taxon:11070"
/clone="rDEN4"
mat_peptide 102..440
/product="anchored capsid (anchC) protein"
mat_peptide 102..398
/product="virion capsid (virC) protein"
CDS 102..10265
/codon_start=1
/product="polyprotein precursor"
/protein_id="AAG45435.1"
/db_xref="GI:12018170"

/translation="MNQRKKVVRPPFNM LKRERNRVSTPQGLVKRFSTGLFSGKGPLR
MVLAFITFLRVLSIPPTAGILKRWGQLKKNKAIKILIGFRKEIGRMLNILNGRKRSTI
TLLCLIPTVMAFSLSTRDGEPLMIVAKHERGRPLLFKTTTEGINKCTLIAMD LGEMCED
TVTYKCP LLVNTEPEDIDWCNLTSTWVMYGTCTQSGERRREKRSVALTPHSGMGLET
RAETWMSSEGAWKHAQRVESWILRNP GFALLAGFMAYMIGQTGIQRTVFFVLMMLVAP
SYGMRCVGVGNRDFVEGVSGGAWVDLVLEHGGCVTTMAQ GKPTLDFELTKTTAKEVAL
LRTYCIEASISNITTATRCPTQGEPYLKEEQDQYICRRDVVDRGWGNGCGLFGKGGV

VTCAKFSCSGKITGNLVQIENLEYTVVVTVHNGDTHAVGNDTSNHGVTAMITPRSPSV
 EVKLDPYGELTLDCEPRSGIDFNEMILMKMKKTWLVHKQWFLDLPLPWTAGADTSEV
 HWNYKERMVTFKVPFAKRQDVTVLGSQEGAMHSALAGATEVDSGDGNHMFAGHLKCKV
 RMEKLRIKMSYTMCSGKFSIDKEMAETQHGTTVVKVKEYEGAGAPCKVPIEIRDVNKE
 KVVGRIISSTPLAENTNSVTNIELEPPFGDSYIVIGVNSALTTLHWFRKGSSIGKMF
 STYRGAKRMAILGETAWDFGSVGGFLTSLGKAVHQVFGSVYTTMFGGVSWMIRILIGF
 LVLWIGTNSRNTSMAMTCIAVGGITLFLGFTVQADMGCVASWSGKELKCGSGIFVVDN
 VHTWTEQYKFQPESPARLASAILNAHKDGVCGIRSTTRLENVMWKQITNELNYVLWEG
 GHDLTVVAGDVKGVLTKGKRALTTPVSDLKYSWKTWGKAKIFTPEARNSTFLIDGPD
 SECPNERRAWNSLEVEDYGFGMFTTNIWMKFREGSSEVCDHRLMSAAIKDQKAVHAD
 GYWIESSKNQTWQIEKASLIEVKTCWPKTHTLWSNGVLESQMLIPKSYAGPFSQHN
 RQGYATQTVGPWHLGKLEIDFGCEPGTTVTIQEDCDHRGPSLRTTTASGKLVTQWCCR
 SCTMPPLRFLGEDGCWYGMEIRPLSEKEENMVKSQVTAGQGTSETFSMGLLCLTLFVE
 ECLRRRVTRKHMILVVVITLCAIILGGLTWMDLLRALIMLGD TMSGRIGGQIHLAIMA
 VFKMSPGYVLGVFLRKLTSRETALMVIGMAMTTVLSIPHDLMELIDGISLGLILLKIV
 TQFDNTQVGTALSLTFIRSTMPLVMAWRTIMAVLFVVTLIPLCRTSCLQKQSHWVEI
 TALILGAQALPVYLMTLMKGASRRSWPLNEGIMAVGLVSLLSALLKNDVPLAGPMVA
 GGLLLAAYVMSGSSADLSLEKAANVQWDEMADITGSSPIVEVKQDEDEGSFSIRDVEET
 NMITLLVKLALITVSGLYPLAIPVTMTLWYMWQVKTRSGALWDVPSPAATKKAALSE
 GYRIMQRGLFGKTQVGVIHMEGVFHTMWHVTRGSVICHETGRLEPSWADVRNDMIS
 YGGGWRLGDKWDKEEDVQVLAIEPGKNPKHVQTKPGLFKTLTGEIGAVTLDFKPGTSG
 SPIINRKGKVI GLYGNVVTKSGDYVSAITQAERIGEPDYEVEDEDIFRKKRLTIMDLH
 PGAGKTKRILPSIVREALKRRLRTLILAPTRVVAEMEEALRGLPIRYQTPAVKSEHT
 GREIVDLMCHATFTTLLSSTRVPNYNLIVMDEAHFTDPSSVAARGYISTRVEMGEAA
 AIFMTATPPGATDPFPQSNSPIEDIEREIPERSWNTGFDWITDYQGKTVWFVPSIKAG
 NDIANCLRKSGKKVIQLSRKTFDTEYPKTKLTDWDFVVTDDISEMGANFRAGRVIDPR
 RCLKPVILPDGPERVILAGPIPVTPASAAQRRGRIGRNPAQEDDQYVFSGDPLKNDED
 HAHWTEAKMLLDNIYTPEGIIPTLFGPEREKTQAIDGEFRLRGEQRKTFVELMRRGDL
 PVWLSYKVASAGISYEDREWCFGTGERNNQILEENMEVEIWTREGEKKLRPRWLDARV
 YADPMALKDFKEFASGRKSITLDILTEIASLPTYLSSRAKLALDNIVMLHTTERGGRA
 YQHALNELPESLETMLLVALLGAMTAGIFLFFMQGKGIGKLSMGLITIAVASGLLWVA
 EIQPQWIAASIILEFFLMVLLIPEPEKQRTPDQNLIIYVILTILTIIGLIAANEMGLI
 EKTCTDFGFYQVKTTETILDVLRPASAWTLYAVATTILTPMLRHTIENTSANLSLAA
 IANQAAVLMGLGKGWPLHRMDLGVPLLAMGCYSQVNPTTLTASLVMLLVHYAIIIGPGL
 QAKATREAQKRTAAGIMKNPTVDGITVIDLEPISYDPKFEKQLGQVMLLVLCAGQLLL
 MRTTWAFCEVLTLATGPILTLWEGNPGRFWNTTIAVSTANIFRGSYLAGAGLAFSLIK
 NAQTPRRGTGTTGETLGEKWKRLNSLDRKEFEYKRS GILEVDRTEAKSALKDGSKI
 KHAVSRGSSKIRWIVERGMVKPKGKVVDLGCGRGWSYMATLKNVTEVKGYTKGGPG
 HEEPIPMATYGNLVKLHSGVDVFKPTEQVDTLLCDIGESSNPTIEEGRTLRLVKM
 VEPWLSSKPEFCIKVLNPYMPVTIEELEKLQRKHGGNLVRCPLSRNSTHEMYWVSGAS
 GNIVSSVNTTSKMLLNRFTRHRKPTYEKDVDLGAGTRSVSTETEKPDMTIIGRRLQR
 LQEEHKETWHYDQENPYRTWAYHGSYEAPSTGSASSMVNGVVKLLTKPWDVIPMVTQL
 AMTDTTPFGQQRVFKEKVDTRTPQPKPGTRMVMTTTANWLWALLGKKKNPRLCTREEF
 ISKVRSNAAIGAVFQEEQGWTSASEAVNDSRFWELVDKERALHQEGKCESCVYNNMGK
 REKKLGEFGRAGKSRAIWMWLGARFLEFEALGFLNEDHWFGRENSWSGVEGEGLHRL
 GYILEEIDKKDGLMYADDTAGWDTRITEDDLQNEELITEQMAPHHKILAKAIFKLTY
 QNKVVKVLRPTPRGAVMDIISRKDQRGSGQVGTYGLNTFTNMEVQLIRQMEAEGVITQ
 DDMQNPKGLKERVEKWLKECGVDRLKRMAISGDDCVVKPLDERFGTSLFLNDMGKVR
 KDIPQWEPKSGWKNWQEVFPCSHHFHKIFMKDGRSLVPCRNQDELIGRARISQGAGW
 SLRETA CLGKAYAQMWSLMYFHRRDLRLASMAICSAVPTWFPSTRTTWSIHAAHQWM
 TTEDMLKVWNRVWIEDNPNMTDKTPVHSHWEDIPYLGKREDLWCGSLIGLSSRATWAKN
 IHTAITQVRNLIGKEEYVDYMPVMKRYSAPESESEGL"

mat_peptide

441..938

/product="membrane precursor (prM) protein"

mat_peptide	714..938	/product="membrane (M) protein"
mat_peptide	939..2423	/product="envelope (E) protein"
mat_peptide	2424..3479	/product="NS1 protein"
mat_peptide	3480..4133	/product="NS2A protein"
mat_peptide	4134..4523	/product="NS2B protein"
mat_peptide	4524..6377	/product="NS3 protein"
mat_peptide	6378..6758	/product="NS4A protein"
mat_peptide	6759..6827	/product="2K protein"
mat_peptide	6828..7562	/product="NS4B protein"
mat_peptide	7563..10262	/product="NS5 protein"

rDEN4 sequence

```

1 agttgttagt ctgtgtggac cgacaaggac agttccaaat cggaagcttg cttaacacag
61 ttctaacagt ttgtttgaat agagagcaga tctctggaaa aatgaaccaa cgaaaaaagg
121 tggtagacc acctttcaat atgctgaaac gcgagagaaa ccgcgtatca acccctcaag
181 ggtagtgaa gagattctca accggacttt tttctgggaa aggaccctta cggatggtgc
241 tagcattcat cacgtttttg cgagtccttt ccatcccacc aacagcaggg attctgaaga
301 gatggggaca gttgaagaaa aataaggcca tcaagatact gattggattc aggaaggaga
361 taggccgcat gctgaacatc ttgaacggga gaaaaaggtc aacgataaca ttgctgtgct
421 tgattcccac cgtaatggcg ttttcctca gcacaagaga tggcgaaccc ctcgatag
481 tggcaaaaca tgaaagggg agacctctct tgtttaagac aacagagggg atcaacaaat
541 gcactctcat tgccatggac ttgggtgaaa tgtgtgagga cactgtcacg tataaatgcc
601 ccctactggt caataccgaa cctgaagaca ttgattgctg gtgcaacctc acgtctacct
661 gggcatgta tgggacatgc acccagagcg gagaacggag acgagagaag cgctcagtag
721 ctttaacacc acattcagga atgggattgg aaacaagagc tgagacatgg atgtcatcgg
781 aaggggcttg gaagcatgct cagagagtag agagctggat actcagaaac ccaggattcg
841 cgctcttggc aggatattatg gcttatatga ttgggcaaac aggaatccag cgaactgtct
901 tctttgtcct aatgatgctg gtcgccccat cctacggaat gcgatgcgta ggagtaggaa
961 acagagactt tgtggaagga gtctcagggt gagcatgggt cgacctggtg ctagaacatg
1021 gaggatgcgt cacaaccatg gccaggggaa aaccaacctt ggattttgaa ctgactaaga
1081 caacagccaa ggaagtggct ctgttaagaa cctattgcat tgaagcctca atatcaaaaa
1141 taactacggc aacaagatgt ccaacgcaag gagagcctta tctgaaagag gaacaggacc
1201 aacagtacat ttgccggaga gatgtggtag acagaggggtg gggcaatggc tgtggcttgt
1261 ttggaaaagg aggagttgtg acatgtgcga agttttcatg ttcggggaag ataacaggca
1321 atttggtcca aattgagaac cttgaatata cagtggttgt aacagtccac aatggagaca
1381 cccatgcagt aggaaatgac acatccaatc atggagttac agccatgata actcccaggt
1441 caccatcggt ggaagtcaaa ttgccggact atggagaact aacactcgat tgtgaacca
1501 ggtctggaat tgactttaat gagatgattc tgatgaaaat gaaaaagaaa acatggctcg
1561 tgcataagca atggtttttg gatctgcctc ttccatggac agcaggagca gacacatcag
1621 aggttctact gaattacaaa gagagaatgg tgacatttaa ggttcctcat gccaagagac
1681 aggatgtgac agtgctggga tctcaggaag gagccatgca ttctgccctc gctggagcca
1741 cagaagtgga ctccggtgat ggaaatcaca tgtttgcagg acatcttaag tgcaaagtcc
1801 gtatggagaa attgagaatc aagggaatgt catacacgat gtgttcagga aagttttcaa

```

1861 ttgacaaaga gatggcagaa acacagcatg ggacaacagt ggtgaaagtc aagtatgaag
1921 gtgctggagc tccgtgtaaa gtcccatag agataagaga tgtaaacaag gaaaaagtgg
1981 ttgggcgtat catctcatcc acccctttgg ctgagaatac caacagtgtg accaacatag
2041 aattagaacc cccctttggg gacagctaca tagtgatagg tgttggaac agcgcattaa
2101 cactccattg gttcaggaaa gggagttcca ttggcaagat gtttgagtc acatacagag
2161 gtgcaaacg aatggccatt ctaggtgaaa cagcttggga ttttggttcc gttggtggac
2221 tgttcacatc attgggaaag gctgtgcacc aggtttttgg aagtgtgtat acaaccatgt
2281 ttggaggagt ctcattggatg attagaatcc taattgggtt cttagtgttg tggattggca
2341 cgaactcgag gaacacttca atggctatga cgtgcatagc tgttgaggga atcactctgt
2401 ttctgggctt cacagttcaa gcagacatgg gttgtgtggc gtcattggag gggaaagaat
2461 tgaagtgtgg aagcggaatt tttgtggttg acaacgtgca cacttggaac gaacagtaca
2521 aatttcaacc agagtcccca gcgagactag cgtctgcaat attaaatgcc cacaagatg
2581 gggctctgtg aattagatca accacgagggc tggaaaatgt catgtggaag caaataacca
2641 acgagctaaa ctatgttctc tgggaaggag gacatgacct cactgtagt gctggggatg
2701 tgaagggggt gttgacaaa ggcaagagag cactcacacc cccagttagt gatctgaaat
2761 attcatggaa gacatgggga aaagcaaaaa tcttcacccc agaagcaaga aatagcacat
2821 ttttaataga cggaccagac acctctgaat gccccaatga acgaagagca tggaaactctc
2881 ttgaggtgga agactatgga tttggcatgt tcacgacca catatggatg aaattccgag
2941 aaggaagtgc agaagtgtgt gaccacaggt taatgtcagc tgcaattaaa gatcagaaag
3001 ctgtgcatgc tgacatgggt tattggatag agagctcaa aaaccagacc tggcagatag
3061 agaaagcatc tcttattgaa gtgaaaacat gtctgtggcc caagaccac aactgtgga
3121 gcaatggagt gctggaaagc cagatgtcca ttccaaaatc atatgcgggc cctttttcac
3181 agcacaatta ccgccagggc tatgccacgc aaaccgtggg cccatggcac ttaggcaaat
3241 tagagataga ctttgagaa tgccccggaa caacagtcac aattcaggag gattgtgacc
3301 atagaggccc atctttgagg accaccactg catctggaaa actagtacag caatggtgct
3361 gccgtcctg cacgatgcct cccttaaggt tcttgggaga agatgggtgc tggatggga
3421 tggagattag gcccttgagt gaaaaagaag agaacatggt caaatcacag gtgacggccg
3481 gacagggcac atcagaaact ttttctatgg gtctgttgtg cctgacctg tttgtggaag
3541 aatgcttgag gagaagagtc actaggaaac acatgatatt agttgtggtg atcactctt
3601 gtgctatcat cctgggaggc ctcacatgga tggacttact acgagccctc atcatgttg
3661 gggacactat gtctggtaga ataggaggac agatccacct agccatcatg gcagtgttca
3721 agatgtcacc aggatacgtg ctgggtgtgt ttttaaggaa actcacttca agagagacag
3781 cactaatggt aataggaatg gccatgacaa cgggtgcttc aattccacat gacctatgg
3841 aactcattga tggaaatca ctgggactaa ttttgctaaa aatagtaaca cagtttgaca
3901 acaccaagt gggaaacctt gctcttctct tgactttcat aagatcaaca atgccattg
3961 tcatggcttg gaggaccatt atggctgtgt tgtttgtggt cacactcatt cctttgtgca
4021 ggacaagctg tcttcaaaaa cagtctcatt gggtagaaat aacagcactc atcctaggag
4081 cccaagctct gccagtgtac ctaatgactc ttatgaaagg agcctcaaga agatcttggc
4141 ctcttaacga gggcataatg gctgtgggtt tgggttagtct cttaggaagc gctcttttaa
4201 agaattgatg cccttttagt ggcccaatgg tggcaggagg ctacttctg gcggttacg
4261 tgatgagtgg tagctcagca gatctgtcac tagagaaggc cgccaacgtg cagtgggatg
4321 aaatggcaga cataacaggc tcaagcccaa tcgtagaagt gaagcaggat gaagatggct
4381 ctttctccat acgggacgtc gaggaacca atatgataac ccttttggtg aaactggcac
4441 tgataacagt gtcaggtctc tacccttgg caattccagt cacaatgacc ttatggtaca
4501 tgtggcaagt gaaaacacaa agatcaggag ccctgtggga cgtccctca cccgtgcca
4561 ctaaaaaagc cgcactgtct gaaggagtgt acaggatcat gcaaagaggg ttattcggga
4621 aaactcaggt tggagtggg atacacatgg aaggtgtatt tcacacaatg tggcatgtaa
4681 caagaggatc agtgatctgc cagcagactg ggagattgga gccatcttgg gctgacgtca
4741 ggaatgacat gatatcatc ggtgggggat ggaggcttgg agacaaatgg gacaaagaag
4801 aagacgttca ggtcctcgcc atagaaccag gaaaaaatcc taaacatgtc caaacgaaac
4861 ctggcctttt caagacccta actggagaaa ttggagcagt aacattagat tcaaacccg
4921 gaacgtctgg ttctcccatc atcaacagga aaggaaaagt catcggaact tatggaaatg
4981 gagtagttac caaatcaggt gattacgtca gtgccataac gcaagccgaa agaattggag
5041 agccagatta tgaagtggat gaggacattt ttcgaaagaa aagattaact ataattggact

5101 tacaccccg agctggaaag acaaaaagaa ttcttccatc aatagtgaga gaagccttaa
5161 aaaggaggct acgaactttg attttagctc ccacgagagt ggtggcggcc gagatggaag
5221 aggccctacg tggactgcca atccgttatc agacccagc tgtgaaatca gaacacacag
5281 gaagagagat tgtagacctc atgtgtcatg caaccttcac aacaagactt ttgtcatcaa
5341 ccagggttcc aaattacaac cttatagtga tggatgaagc acatttcacc gatccttcta
5401 gtgtcgcggc tagaggatac atctcgacca ggggtgaaat gggagaggca gcagccatct
5461 tcatgaccgc aacccctccc ggagcgacag atccctttcc ccagagcaac agcccaatag
5521 aagacatcga gagggaaatt ccggaagggt catggaacac agggttcgac tggataacag
5581 actaccaagg gaaaactgtg tggtttggtc ccagcataaa agctggaaat gacattgcaa
5641 attgtttgag aaagtcggga aagaaagtta tccagttgag taggaaaacc tttgatacag
5701 agtatccaaa aacgaaactc acggactggg actttgtggt cactacagac atatctgaaa
5761 tgggggccaa ttttagagcc gggagagtga tagaccctag aagatgcctc aagccagtta
5821 tcctaccaga tgggcccagag agagtcattt tagcagggtcc tattccagtg actccagcaa
5881 gcgctgctca gagaagaggg cgaataggaa ggaacccagc acaagaagac gaccaatacag
5941 ttttctccgg agacccacta aaaaatgatg aagatcatgc ccactggaca gaagcaaaga
6001 tgctgcttga caatatctac accccagaag ggatcattcc aacattgttt ggtccggaag
6061 gggaaaaaac ccaagccatt gatggagagt ttcgcctcag aggggaacaa aggaagactt
6121 ttgtggaatt aatgaggaga ggagaccttc cgggtgtggc gagctataag gtagcttctg
6181 ctggcatttc ttacgaagat cgggaatggt gcttcacagg ggaagaaat aaccaaattt
6241 tagaagaaaa catggaggtt gaaatttgga ctagagaggg agaaaagaaa aagctaaggc
6301 caagatgggt agatgcacgt gtatacgctg accccatggc tttgaaggat ttcaaggagt
6361 ttgccagtgg aaggaagagt ataactctcg acatcctaac agagattgcc agtttgccaa
6421 cttaccttcc ctctagggcc aagctcgccc ttgataacat agtcatgctc cacacaacag
6481 aaagaggagg gagggcctat caacacgccc tgaacgaact tccggagtca ctggaaacac
6541 tcatgcttgt agctttacta ggtgctatga cagcaggcat cttcctgttt ttcattgcaag
6601 ggaaaggaat agggaaattg tcaatgggtt tgataacat tgcggtggct agtggttgc
6661 tctgggtagc agaaattcaa cccagtgga tagcggcctc aatcatacta gagttttttc
6721 tcatggtact gttgataccg gaaccagaaa aacaaaggac cccacaagac aatcaattga
6781 tctacgtcat attgaccatt ctacccatca ttggtctaag agcagccaac gagatggggc
6841 tgattgaaaa aacaaaaacg gattttggtt tttaccaggt aaaaacagaa accaccatcc
6901 tcgatgtgga cttgagacca gcttcagcat ggacgctcta tgcagtagcc accacaattc
6961 tgactcccat gctgagacac accatagaaa acacgtcggc caacctatct ctacagcca
7021 ttgccaacca ggcagccgct ctaatggggc ttggaaaagg atggccgctc cacagaatgg
7081 acctcggtgt gccgctgtta gcaatgggat gctattctca agtgaaccca acaaccttga
7141 cagcatcctt agtcatgctt ttagtccatt atgcaataat agggccagga ttgcaggcaa
7201 aagccacaag agaggcccag aaaaggacag ctgctgggat catgaaaaat cccacagtgg
7261 acgggataac agtaatagat ctagaaccaa tatcctatga cccaaaattt gaaaagcaat
7321 tagggcaggt catgctacta gtcttggtgt ctggacaact actcttgatg agaacaacat
7381 gggctttctg tgaagtcttg actttggcca caggaccaat cttgaccttg tgggagggca
7441 acccggaag gttttggaac acgaccatag ccgtatccac cgccaacatt ttcaggggaa
7501 gttacttgcc gggagctgga ctggcttttt cactcataaa gaatgcacaa acccctagga
7561 ggggaactgg gaccacagga gagacactgg gagagaagtg gaagagacag ctaaactcat
7621 tagacagaaa agagtgtgaa gagtataaaa gaagtggaat actagaagtg gacaggactg
7681 aagccaagtc tgccctgaaa gatgggtcta aaatcaagca tgcagtatca agagggcca
7741 gtaagatcag atggattgtt gagagaggga tggtaaagcc aaaaggga gttgtagatc
7801 ttggctgtgg gagaggagga tggcttatt acatggcgac actcaagaac gtgactgaag
7861 tgaaagggtta taaaaagga ggtccaggac atgaagaacc gattcccatg gctacttatg
7921 gttggaattt ggtcaaactc cattcagggg ttgacgtgtt ctacaaaccc acagagcaag
7981 tggacaccct gctctgtgat attggggagt catcttctaa tccaacaata gaggaaggaa
8041 gaacattaag agttttgaag atgggtggagc catggctctc ttcaaacctt gaattctgca
8101 tcaaagtcct taaccctac atgccaacag tcatagaaga gctggagaaa ctgcagagaa
8161 aacatggtgg gaaccttgct agatgcccgc tgtccaggaa ctccacccat gagatgtatt
8221 ggggtgtcagg agcgtcgga aacattgtga gctctgtgaa cacaacatca aagatgttgt
8281 tgaacaggtt cacaacaagg cataggaaac ccacttatga gaaggacgta gatcttgggg

8341 caggaacgag aagtgtctcc actgaaacag aaaaaccaga catgacaatc attgggagaa
8401 ggcttcagcg attgcaagaa gagcacaag aaacctggca ttatgatcag gaaaacccat
8461 acagaacctg ggcgtatcat ggaagctatg aagctccttc gacaggctct gcatcctcca
8521 tgggtgaacgg ggtggtaaaa ctgctaacaa aaccctggga tgtgattcca atggtgactc
8581 agttagccat gacagataca accccttttg ggcaacaaaag agtgttcaaa gagaagggtg
8641 ataccagaac accacaacca aaacccggtta cacgaatggt tatgaccacg acagccaatt
8701 ggctgtgggc cctccttgga aagaagaaaa atcccagact gtgcacaagg gaagagttca
8761 tctcaaaagt tagatcaaac gcagccatag ggcgagctct tcaggaagaa cagggatgga
8821 catcagccag tgaagctgtg aatgacagcc ggttttgga actggttgac aaagaaaggg
8881 ccctacacca ggaagggaaa tgtgaatcgt gtgtctataa catgatggga aaacgtgaga
8941 aaaagttagg agagtttggc agagccaagg gaagccgagc aatctggtac atgtggctgg
9001 gagcgcggtt tctggaatth gaagccctgg gttttttgaa tgaagatcac tggtttggca
9061 gagaaaattc atggagtggga gtggaagggg aaggtctgca cagattggga tatatcctgg
9121 aggagataga caagaaggat ggagacctaa tgtatgctga tgacacagca ggctgggaca
9181 caagaatcac tgaggatgac cttcaaaatg aggaactgat cacggaacag atggctcccc
9241 accacaagat cctagccaaa gccattttca aactaaccta tcaaaacaaa gtggtgaaag
9301 tcctcagacc cacaccgagg ggagcgggtg tggatatcat atccaggaaa gaccaaagag
9361 gtagtggaca agttggaaca tatggtttga acacattcac caacatggaa gttcaactca
9421 tccgccaaat ggaagctgaa ggagtcatca cacaagatga catgcagaac ccaaaagggg
9481 tgaaagaaag agttgagaaa tggctgaaag agtggtggtg cgacagggtta aagaggatgg
9541 caatcagtg agacgattgc gtggtgaagc ccctagatga gaggtttggc acttccctcc
9601 tcttcttgaa cgacatggga aaggtgagga aagacattcc gcagtgggaa ccatctaagg
9661 gatggaaaaa ctggcaagag gttccttttt gctcccacca ctttcacaag atctttatga
9721 aggatggccg ctactagtt gttccatgta gaaaccagga tgaactgata gggagagcca
9781 gaatctcgca gggagctgga tggagcttaa gagaaacagc ctgcctgggc aaagcttacg
9841 ccagatgtg gtcgcttatg tacttccaca gaaggatct gcgtttagcc tccatggcca
9901 tatgctcagc agttccaacg gaatggtttc caacaagcag aacaacatgg tcaatccacg
9961 ctcatcacca gtggatgacc actgaagata tgctcaaagt gtggaacaga gtgtggatag
10021 aagacaaccc taatatgact gacaagactc cagtccattc gtgggaagat ataccttacc
10081 tagggaaaag agaggatttg tgggtggtg ccctgattgg actttcttcc agagccacct
10141 gggcgaagaa cattcatagc gccataaccc aggtcaggaa cctgatcgga aaagaggaat
10201 acgtggatta catgccagta atgaaaagat acagtgtctc ttcagagagt gaaggagttc
10261 tgtaattacc aacaacaaac accaaaggct attgaagtca ggccacttgt gccacggttt
10321 gagcaaaccg tgctgcctgt agctccgcca ataattgggag gcgtaataat cccagggag
10381 gccatgcgcc acggaagctg tacgcgtggc atattggact agcggtaga ggagaccct
10441 cccatcactg ataaaacgca gcaaaagggg gcccgagcc aggaggaagc tgtactcctg
10501 gtggaaggac tagaggttag aggagacccc ccaacacaa aaacagcata ttgacgctgg
10561 gaaagaccag agatcctgct gtctctgcaa catcaatcca ggcacagagc gccgcaagat
10621 ggattggtgt tgttgatcca acaggttct